

Moustapha Harb, PhD, PE

New Mexico Institute of Mining and Technology
Department of Civil and Environmental Engineering
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EDUCATION

Ph.D. in Environmental Science and Engineering, August 2017
King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia

M.S. in Environmental Engineering, May 2010
University of Houston, Houston, Texas, USA

B.S. in Civil Engineering, May 2007
University of Houston, Houston, Texas, USA

ACADEMIC POSITIONS

Assistant Professor of Environmental Engineering
New Mexico Institute of Mining and Technology (NMT), Socorro, New Mexico, USA
August 2022 – Present

Assistant Professor of Civil and Environmental Engineering
Lebanese American University (LAU), Byblos, Lebanon
January 2019 – July 2022

Postdoctoral Research Associate
University of Southern California (USC), Los Angeles, California, USA
August 2017 – December 2018

Research Assistant
Water Desalination and Reuse Center (WDRC), KAUST, Thuwal, Saudi Arabia
August 2012 – July 2017

INDUSTRY POSITIONS

Environmental Engineer
C-K Associates, Houston, Texas, USA
July 2011 – July 2012

Lead Project Engineer
Cobb, Fendley & Associates, Houston, Texas, USA
May 2006 – July 2011

TEACHING AND MENTORING EXPERIENCE

Courses at NMT

- CEE 5012 – Industrial Water and Wastewater Treatment
- CEE 5071 – Bioprocesses for Wastewater Resource Recovery
- ENVE 3003 – Water Treatment Process Design
- ENVE 3004 – Wastewater Treatment Process Design

Courses at LAU

- CIE 527 – Environmental Microbiology
- CIE 598 – Advanced Biological Wastewater Treatment
- CIE 520 – Solid Waste Management
- CIE 522 – Environmental Impact Assessment
- CIE 526 – Environmental Remediation
- CIE 321 – Fluid Mechanics Laboratory
- CIE 322 – Hydraulics

Postdoctoral Advising

- Josephine Al Alam, 2019 – 2022
- Stephanie Greige, 2021 – 2022

Graduate Advising - Ph.D.

- Lama Ramadan, 2023 – present

Graduate Advising - Masters

- Aakriti Sharma, 2023 – present
- Charbel El Khoury, 2020 – 2022
- Lama Ramadan, 2020 – 2022
- Christelle Sawaya, 2020 – 2022
- Reem Zeeb, 2020 – 2022

Undergraduate Advising

- Christelle Sawaya, 2019

Thesis Committees - Masters

- Samuel Oppong, 2023 (CEE)
- Mohamad Abdallah, 2022 (CEE)
- Michelle Ghosn, 2022 (CEE)
- Reem Hachem, 2022 (CEE)
- Charbel El Khoury, 2022 (CEE)
- Caroline Merheb, 2022 (CEE)
- Lama Ramadan, 2022 (CEE)
- Christelle Sawaya, 2022 (CEE)
- Saad Allah Solh, 2022 (CEE)
- Reem Zeeb, 2022 (CEE)
- Maria El Khoury, 2020 (Biology)
- Jennifer Moussa, 2019 (Biology)

PUBLICATIONS (*corresponding author)

- L. Ramadan, R. Deeb, C. Sawaya, C. El Khoury, M. Wazne, and M. Harb* (2023), Anaerobic membrane bioreactor-based treatment of poultry slaughterhouse wastewater: Microbial community adaptation and antibiotic resistance gene profiles. *Biochemical Engineering Journal*, Vol. 192, Art. 108847

- J. Al Alam, M. Harb, T. Hage, and M. Wazne* (2023), Assessment of *Opuntia ficus-indica* (L.) Mill. extracts for the removal of lead from soil: The role of CAM plant harvest phase and soil properties. *Environmental Science and Pollution Research*, Vol. 30, Pages 798-810
- J. Al Alam, M. Millet, M. Harb, E. Akoury, S. Tokajian, and M. Wazne* (2023), Field evaluation of metal bioaccumulation in the gastropod *Helix aspersa* at agricultural and industrial sites in Lebanon. *Environmental Monitoring and Assessment*, Vol. 195, Art. 197
- C. Sawaya, L. Ramadan, C. El Khoury, J. Al Alam, M. Wazne, and M. Harb* (2022), Targeted pressure-based development of membrane biofilms improves anaerobic membrane bioreactor effluent quality. *Environmental Science: Water Research & Technology*, Vol. 8, Iss. 9, Pages 1859-1873
- C. Sawaya, C. El Khoury, L. Ramadan, R. Deeb, and M. Harb* (2022), Effects of influent municipal wastewater microbial community and antibiotic resistance gene profiles on anaerobic membrane bioreactor effluent. *Water Reuse*, Vol. 12, Iss. 3, Art. 305
- M. Abdallah, S. Greige, H. Beyenal, M. Harb, and M. Wazne* (2022), Investigating microbial dynamics and potential advantages of anaerobic co-digestion of cheese whey and poultry slaughterhouse wastewaters. *Scientific Reports*, Vol. 12, Art. 10529
- J. Al Alam, M. Millet, D. Khoury, A. Rodrigues, M. Harb, E. Akoury, S. Tokajian and M. Wazne* (2022), Snails as Temporal Biomonitoring of the Occurrence and Distribution of Pesticides in an Apple Orchard. *Atmosphere*, Vol. 13, Art. 1185
- C. Sawaya and M. Harb* (2021), Considering the prospect of utilizing anaerobic membrane biofouling layers advantageously for the removal of emerging contaminants. *Frontiers in Chemical Engineering*, Vol. 3, Art. 642280
- M. Harb, A. Zarei-Baygi, P. Wang, C. Sawaya, D. L. McCurry, L.B. Stadler, and A.L. Smith* (2021), Antibiotic transformation in an anaerobic membrane bioreactor linked to membrane biofilm microbial activity. *Environmental Research*, Vol. 200, Art. 111456
- A. Zarei-Baygi, P. Wang, M. Harb, L.B. Stadler, and A.L. Smith* (2020), Membrane fouling inversely impacts intracellular and extracellular antibiotic resistance gene abundances in the effluent of an anaerobic membrane bioreactor. *Environmental Science & Technology*, Vol. 54, Iss. 13, Pages 12742-12751
- M. Harb, N. Ermer, C. Sawaya, and A.L. Smith* (2020), Increased applied voltage in the presence of GAC enhances microbial activity and methane production during anaerobic digestion of food waste. *Environmental Science: Water Research & Technology*, Vol. 6, Iss. 3, Pages 737-746
- E. Lou, M. Harb, A.L. Smith, and L.B. Stadler* (2020), Livestock manure improved antibiotic resistance gene removal during co-treatment of domestic wastewater in an anaerobic membrane bioreactor. *Environmental Science: Water Research & Technology*, Vol. 6, Iss. 10, Pages 2832-2842
- A. Zarei-Baygi, M. Harb, P. Wang, L.B. Stadler, and A.L. Smith* (2020), Microbial community and antibiotic resistance profiles of biomass and effluent are distinctly affected by antibiotics addition to an anaerobic membrane bioreactor. *Environmental Science: Water Research & Technology*, Vol. 6, Iss. 3, Pages 724-736
- M. Harb, P. Wang, A. Zarei-Baygi, M.H. Plumlee, and A.L. Smith* (2019), Background Antibiotic Resistance and Microbial Communities Dominate Effects of Advanced Purified Water Recharge to an Urban Aquifer. *Environmental Science & Technology Letters*, Vol. 6, Iss.10, Pages 578-584
- M. Harb, E. Lou, A.L. Smith, and L.B. Stadler* (2019), Perspectives on the fate of micropollutants in mainstream anaerobic wastewater treatment. *Current Opinion in Biotechnology*, Vol. 57, Pages 94-100
- A. Zarei-Baygi, M. Harb, P. Wang, L.B. Stadler, and A.L. Smith* (2019), Evaluating Antibiotic

Resistance Gene Correlations with Antibiotic Exposure Conditions in Anaerobic Membrane Bioreactors. *Environmental Science & Technology*, Vol. 53, Iss. 7, Pages 3599-3609

- S. Chen, M. Harb, P. Sinha, and A.L. Smith* (2018), Revisiting greenhouse gas mitigation from conventional activated sludge and anaerobic-based wastewater treatment systems. *Environmental Science: Water Research & Technology*, Vol. 4, Iss.11, Pages 1739-1758
- M. Harb and P.Y. Hong* (2017), Molecular-based detection of potentially pathogenic bacteria in membrane bioreactor (MBR) systems treating municipal wastewater: a case study. *Environmental Science and Pollution Research*, Vol. 24, Iss. 6, Pages 5370-5380
- M. Harb and P.Y. Hong* (2017), Anaerobic membrane bioreactor effluent reuse: a review of microbial safety concerns. *Fermentation*, Vol. 3, Iss. 3, Pages 39-67
- Y. Xiong, M. Harb, and P.Y. Hong* (2017), Performance and microbial community variations of anaerobic digesters under increasing tetracycline concentrations. *Applied Microbiology and Biotechnology*, Vol. 101, Iss.13, Pages 5505-5517
- G. Scarascia, H. Cheng, M. Harb, and P.Y. Hong* (2017), Application of hierarchical oligonucleotide primer extension (HOPE) to assess relative abundances of ammonia- and nitrite-oxidizing bacteria. *BMC Microbiology*, Vol. 17, Iss. 1, Article No. 85
- M. Harb, C.H. Wei, N. Wang, G. Amy, and P.Y. Hong* (2016), Organic micropollutants in aerobic and anaerobic membrane bioreactors: Changes in microbial communities and gene expression. *Bioresource Technology*, Vol. 218, Pages 882-891
- Y. Xiong, M. Harb and P.Y. Hong* (2016), Characterization of biofoulants illustrates different membrane fouling mechanisms for aerobic and anaerobic membrane bioreactors. *Separation and Purification Technology*, Vol. 157, Pages 192-202
- M. Harb, Y. Xiong, J.S. Guest, G. Amy, P.Y. Hong* (2015), Differences in microbial communities and performance between suspended and attached growth anaerobic membrane bioreactors treating synthetic municipal wastewater. *Environmental Science: Water Research & Technology*, Vol. 1, Iss. 6, Pages 800-813
- N. Al-Jassim, M.I. Ansari, M. Harb, and P.Y. Hong* (2015), Removal of bacterial contaminants and antibiotic resistance genes by conventional wastewater treatment processes in Saudi Arabia: Is the treated wastewater safe to reuse for agricultural irrigation? *Water Research*, Vol. 73, Pages 277–290
- M.I. Ansari, M. Harb, B. Jones, and P.Y. Hong* (2015), Molecular-based approaches to characterize coastal microbial community and their potential relation to the trophic state of Red Sea. *Scientific Reports*, Vol. 5, Art. No. 9001
- C.H. Wei*, M. Harb, G. Amy, P.Y. Hong, and T.O. Leiknes (2014), Sustainable organic loading rate and energy recovery potential of mesophilic anaerobic membrane bioreactor for municipal wastewater treatment. *Bioresource Technology*, Vol. 166, Pages 326–334

INVITED PRESENTATIONS

- M. Harb (2022), Addressing emerging contaminants in wastewater: The role of biofilm-based strategies in anaerobic treatment systems. *NMT Chemistry Department Seminar*, Socorro, NM
- M. Harb (2022), Treatment of industrial wastewaters using anaerobic membrane bioreactors (AnMBRs). *2nd USAID Workshop for advancing anaerobic digestion in the upper Litani basin for industrial waste treatment*, Beirut, Lebanon
- M. Harb (2022), Membrane biofilm-based strategies in anaerobic membrane bioreactors to improve mitigation of emerging contaminants. *KAUST Water Desalination and Reuse Center (WDRC) Seminar*, Thuwal, Saudi Arabia
- M. Harb (2021), Coupling membrane separation with anaerobic digestion for treatment of diverse

waste streams. *1st USAID Workshop for advancing anaerobic digestion in the upper Litani basin for industrial waste treatment*, Beirut, Lebanon

- M. Harb (2020), Interpreting the implications of observed antibiotic resistance gene data in various water reuse scenarios. *Webinar for the DAM Chair for Integral Management and Resource Recovery of Wastewater at the University of Valencia*, Valencia, Spain
- M. Harb (2019), Implications of Contaminants of Emerging Concern (CECs) on Water Reuse in the Arab Region: Exploring sustainable decentralized treatment solutions. *7th National Academies' Arab-American Frontiers of Science, Engineering and Medicine Symposium*, Cairo, Egypt
- M. Harb (2019), Considering the Ethical Implications of Promoting Reclaimed Water Reuse for Agricultural Applications in Lebanon. *UNESCO Commission on the Ethics of Scientific Knowledge and Technology Conference*, Beirut, Lebanon

CONFERENCE PRESENTATIONS (presenter underlined)

- L. Ramadan, C. Sawaya, R. Deeb, C. El Khoury, M. Wazne, and M. Harb (2023), Assessing anaerobic membrane bioreactor suitability for treatment of diverse influent types: A look into effluent antibiotic resistance gene and microbial community variability. *2023 AEESP Research and Education Conference*, Boston, Massachusetts (platform presentation)
- L. Ramadan, R. Deeb, C. El Khoury, C. Sawaya, and M. Harb (2023), Insights into membrane biofilms and their potential role in enhancing micropollutant degradation during mainstream anaerobic wastewater treatment. *2023 AEESP Research and Education Conference*, Boston, Massachusetts (poster)
- C. Sawaya, L. Ramadan, C. El Khoury, J. Al Alam, M. Wazne, and M. Harb (2022), Assessing membrane biofilm predevelopment strategies to improve anaerobic membrane bioreactor effluent quality. *17th International Water Association (IWA) World Congress on Anaerobic Digestion*, Ann Arbor, Michigan, USA (platform presentation)
- C. El Khoury, R. Deeb, C. Sawaya, L. Ramadan, and M. Harb (2022), Tetracycline addition to an anaerobic membrane bioreactor and antibiotic resistance gene proliferation from different membrane types. *17th International Water Association (IWA) World Congress on Anaerobic Digestion*, Ann Arbor, Michigan, USA (platform presentation)
- L. Ramadan, R. Deeb, C. Sawaya, C. El Khoury, M. Wazne, and M. Harb (2022), Poultry slaughterhouse wastewater treatment by an anaerobic membrane bioreactor: Evaluation of system performance and key microbial elements. *17th International Water Association (IWA) World Congress on Anaerobic Digestion*, Ann Arbor, Michigan, USA (platform presentation)
- M. Abdallah, S. Greige, M. Harb, and M. Wazne (2022) Enhancement of start-up and performance of a UASB reactor through electrochemical enrichment of biofilm. *17th International Water Association (IWA) World Congress on Anaerobic Digestion*, Ann Arbor, Michigan, USA (poster)
- C. Sawaya, C. El Khoury, L. Ramadan, R. Deeb, and M. Harb (2022), Interpreting domestic wastewater antibiotic resistance gene profile influence on treated effluents for an anaerobic membrane bioreactor. *12th Micropol & Ecohazard Conference of the International Water Association (IWA)*, Santiago de Compostela, Spain (platform presentation)
- C. Sawaya, L. Ramadan, J. Al-Alam, M. Wazne, and M. Harb (2021), Effect of membrane biofilms and transmembrane velocity in an anaerobic membrane bioreactor on effluent quality and dissolved methane. *9th Microbial Ecology and Water Engineering (MEWE) Conference of the International Water Association (IWA)*, Delft, Netherlands (virtual platform presentation)
- M. Harb (2021), Anaerobic membrane biofilm development for mitigating the threat of antibiotics in wastewater. *8th National Academies' Arab-American Frontiers of Science, Engineering and*

Medicine Symposium, Doha, Qatar (virtual poster)

- M. Harb, N. Ermer, and A.L. Smith (2019), Impact of applied voltage on methane production and microbial activity in anaerobic digesters in the presence of granular activated carbon (GAC). *16th International Water Association (IWA) Conference on Anaerobic Digestion*, Delft, Netherlands ([platform presentation](#))
- A. Zarei-Baygi, P. Wang, M. Harb., L.B. Stadler, and A.L. Smith (2019), Evaluating antibiotic resistance proliferation in anaerobic membrane bioreactors under different antibiotic exposure conditions. *16th International Water Association (IWA) Conference on Anaerobic Digestion*, Delft, Netherlands ([platform presentation](#))
- A. Zarei-Baygi, M. Harb, P. Wang, L.B. Stadler, and A.L. Smith (2019), Role of membrane foulant layers in antibiotic resistance gene fate from anaerobic membrane bioreactors. *AEESP Research and Education Conference*, Tempe, Arizona ([poster](#))
- P. Wang, M. Harb, A. Zarei-Baygi, L.B. Stadler, and A.L. Smith, (2019), The effect of elevated antibiotic levels on intracellular and extracellular antibiotic resistance genes in AnMBR effluent. *AEESP Research and Education Conference*, Tempe, Arizona ([poster](#))
- M. Harb, A. Zarei-Baygi, P. Wang, and A.L. Smith (2018), Potential reduction of antibiotic resistance proliferation in anaerobic membrane bioreactor (AnMBR) microbial communities. *17th International Society of Microbial Ecology (ISME) Conference*, Leipzig, Germany ([poster](#))
- A. Zarei-Baygi, M. Harb, P. Wang, L.B. Stadler, and A.L. Smith (2018), Investigation of anaerobic membrane bioreactor (AnMBR) potential to reduce antibiotic resistance proliferation and promote wastewater reuse. *256th American Chemical Society (ACS) National Meeting*, Boston, Massachusetts ([platform presentation](#))
- M. Harb and P.Y. Hong (2016), Molecular-based detection of potentially pathogenic bacteria in aerobic and anaerobic membrane bioreactors: comparison of removal rates and risk during reuse events. *7th Microbial Ecology and Water Engineering (MEWE) Conference of the International Water Association (IWA)*, Copenhagen, Denmark ([poster](#))
- M. Harb, C.H. Wei, N. Wang, G. Amy, and P.Y. Hong (2016), Organic micropollutants in aerobic and anaerobic MBRs: microbial communities, antibiotic resistance genes, and gene expression. *7th Microbial Ecology and Water Engineering (MEWE) Conference of the International Water Association (IWA)*, Copenhagen, Denmark ([poster](#))
- G. Scarascia, H. Cheng, M. Harb, and P.Y. Hong (2016), Correlating the relative abundance of ammonia- and nitrite-oxidizing bacteria with nitrification performance using hierarchical oligonucleotide primer extension (HOPE). *7th Microbial Ecology and Water Engineering (MEWE) Conference of the International Water Association (IWA)*, Copenhagen, Denmark ([poster](#))
- M. Harb, C.H. Wei, N. Wang, G. Amy, and P.Y. Hong (2016), Effect of organic micropollutants on the microbial populations of both aerobic and anaerobic MBRs. *Singapore International Water Week (SIWW) 2016*, Singapore ([poster](#))
- M. Harb, Y. Xiong, J. Guest, G. Amy, and P.Y. Hong (2015), Microbial dynamics and membrane biofouling in suspended and attached growth anaerobic membrane bioreactors treating synthetic municipal wastewater. *250th American Chemical Society (ACS) National Meeting*, Boston, Massachusetts ([platform presentation](#))
- P.Y. Hong, N. Al-Jassim, M.I. Ansari, and M. Harb (2015), Removal of bacterial contaminants and antibiotic resistance genes by conventional wastewater treatment processes in Saudi Arabia: Is the treated wastewater safe to reuse for agricultural irrigation? *250th American Chemical Society (ACS) National Meeting*, Boston, Massachusetts ([platform presentation](#))
- M. Harb, C.H. Wei, N. Wang, G. Amy, and P.Y. Hong (2014), Organic micro-pollutant (OMP) spiking effect on microbial populations of aerobic and anaerobic membrane bioreactors (MBRs).

248th American Chemical Society (ACS) National Meeting, San Francisco, California ([poster](#))

- [M.I. Ansari](#), M. Harb, B. Jones, and P.Y. Hong (2014), Effect of anthropogenic contamination on marine water microbial community of the Red Sea. 15th International Symposium of Microbial Ecology (ISME), Seoul, South Korea ([poster](#))
- [Y. Xiong](#), M. Harb, G. Amy, and P.Y. Hong (2014), Characteristics of soluble microbial products and bound extracellular polymeric substances in anaerobic membrane bioreactors. 1st IWA EPS Slime Conference, Essen, Germany ([poster](#))
- [Y. Xiong](#), M. Harb, and P.Y. Hong (2014), Size Distribution of extracellular polymeric substances and soluble microbial products in upflow attached anaerobic membrane bioreactors. 4th MBR Workshop for the Next Generation and Waste-to-Energy Conversion, Gunsan, Korea ([platform presentation](#))
- [M. Harb](#), C.H. Wei, N. Wang, G. Amy, and P.Y. Hong (2013), Initial Microbial Population Dynamics of Anaerobic Membrane Bioreactors (AnMBRs) in Attached Growth and Continuously Stirred Reactors. 7th Microbial Ecology and Water Engineering (MEWE) Conference of the International Water Association (IWA), Ann Arbor, Michigan ([poster](#))

RESEARCH SUPPORT

ERI: Dynamic membranes in anaerobic wastewater treatment systems: Enhancing mitigation of emerging microbial threats to promote safe water reuse

National Science Foundation (NSF) \$199,795 (2023-2025)

Assessment of fungal pathogen occurrence in Rio Grande irrigation canals

IDeA Networks of Biomedical Research Excellence (INBRE) \$31,576 (2023-2024)

Evaluation and development of anaerobic membrane bioreactor (AnMBR) technology to promote unrestricted wastewater reuse and mitigate surface water quality in the Mediterranean region

PIs: Moustapha Harb (Lebanese American Univ.), Angel Robles (Univ. de València), Christelle Guigui (INSA-Toulouse), and Abdelsalam El-Awwad (Cairo Univ.)

Partnership for Res. and Innov. in the Mediterranean Area (PRIMA) €385,000 (2020-2022)

PROFESSIONAL MEMBERSHIPS

- Association of Environmental Engineering & Science Professors (AEESP)
- International Water Association (IWA)
- Texas Board of Professional Engineers and Land Surveyors

CERTIFICATIONS AND AWARDS

- Professional Engineer (State of Texas), Issued December 2010 (License No. 107375)
- KAUST Academic Fellowship, 2012-2017
- John Malloy Endowed Graduate Fellowship, 2008- 2010
- University of Houston Academic Excellence Scholarship, 2003-2007

ACADEMIC SERVICE

- University Faculty Senate (Vice Chair), 2021-2022
- School of Engineering Academic Committee (Member), 2021-2022
- School of Engineering Student Affairs Committee (Chair), 2020-2022
- School of Engineering Student Affairs Committee (Member), 2019-2020

- Department Graduate Program Advisory Committee (Member), 2019-2022
- School of Engineering Summer Camp Ad-Hoc Committee (Member), 2019

PROFESSIONAL SERVICE

Professional Society Contributions

- Organizing Committee, 17th IWA World Congress on Anaerobic Digestion (2022)
- Scientific Committee, 17th IWA World Congress on Anaerobic Digestion (2022)
- Session Moderator, 17th IWA World Congress on Anaerobic Digestion (2022)

Journal Review Contributions

- Manuscript Reviewer, Bioresource Technology
- Manuscript Reviewer, Bioresource Technology Reports
- Manuscript Reviewer, Chemical Engineering Journal
- Manuscript Reviewer, Chemosphere
- Manuscript Reviewer, Environmental Science and Technology
- Manuscript Reviewer, Environment International
- Manuscript Reviewer, Environmental Science: Water Research and Technology
- Manuscript Reviewer, Environmental Pollution
- Manuscript Reviewer, Environmental Science and Pollution Research
- Manuscript Reviewer, Frontiers in Environmental Science
- Manuscript Reviewer, Frontiers in Microbiology
- Manuscript Reviewer, Journal of Membrane Science
- Manuscript Reviewer, Journal of Hazardous Materials
- Manuscript Reviewer, Journal of Water Process Engineering
- Manuscript Reviewer, Process Safety and Environmental Protection
- Manuscript Reviewer, Scientific Reports
- Manuscript Reviewer, Science of the Total Environment
- Manuscript Reviewer, Separation and Purification Technology
- Manuscript Reviewer, Water Science and Technology